

ITX-E3500

Q35, Mini-ITX

User's Manual

Rev.01, Aug. 2009

Statement

All rights reserved. No part of this publication may be reproduced in any form or by any means, without prior written permission of the publisher.

All trademarks are the properties of the respective owners.

All product specifications are subject to change without prior notice.

Packing List

- ☐ 1 x System board
- ☐ 1 x Driver CD (Include user's manual)
- ☐ 1 x IO Shield
- ☐ 1 x Serial ATA data cable
- ☐ 1 x RS-232 cable (1 Port)
- ☐ 1 x USB cable (2 Port)
- ☐ 1 x Printer cable

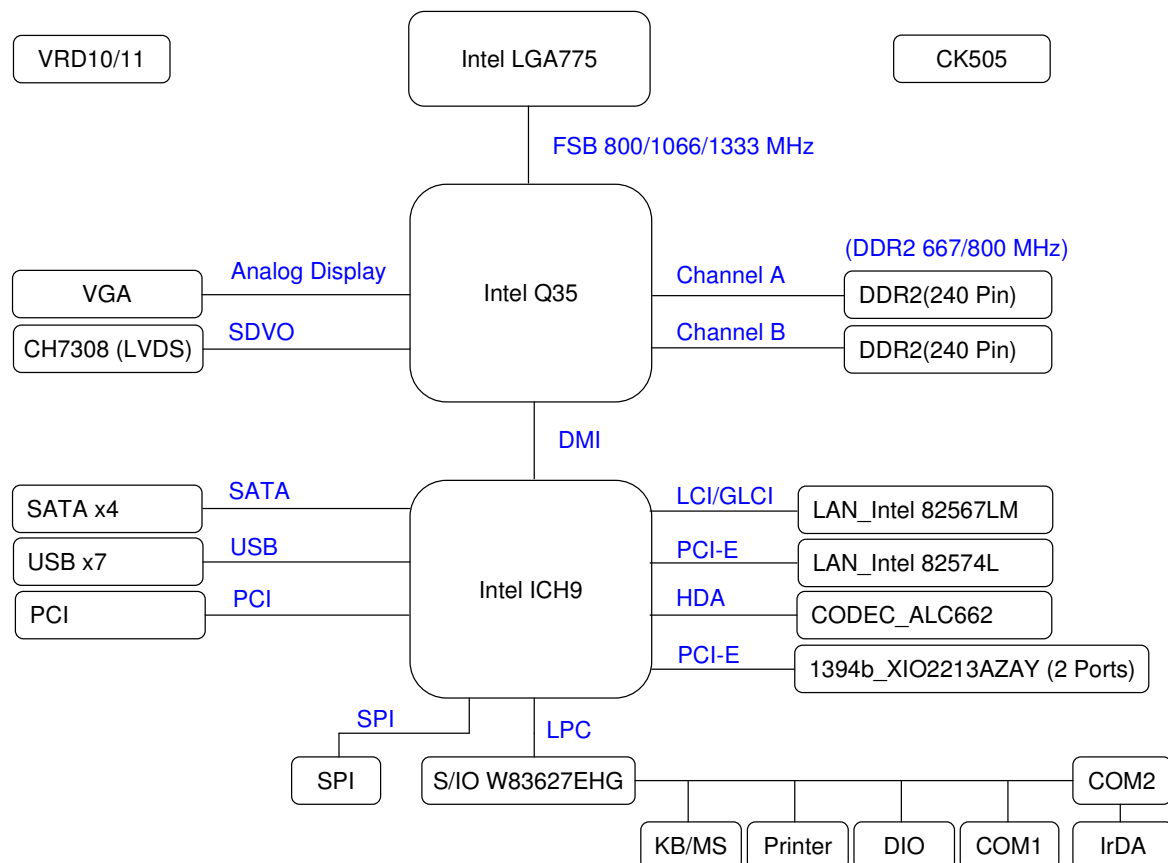
Contents

Chapter 1 Product Information	4
1.1 Block Diagram	4
1.2 Features	5
1.3 PCB Layout	7
1.4 Jumper Setting	8
1.5 Connector Function List	10
1.6 Internal Connector Pin Define	11
 Chapter 2 BIOS Setup	 15
2.1 Main Menu	15
2.2 Standard CMOS Features	16
2.3 Advanced BIOS Features	17
2.4 Advanced Chipset Features	20
2.5 Integrated Peripherals	22
2.6 Power Management Setup	26
2.7 PnP/PCI Configurations	28
2.8 PC Health Status	29
2.9 Frequency/Voltage Control	30
2.10 Load Fail-Safe Defaults	31
2.11 Load Optimized Defaults	32
2.12 Set Supervisor Password	33
2.13 Set User Password	34
2.14 Save & Exit Setup	35
2.15 Exit Without Saving	36
 Chapter 3 Drivers Installation	 37
3.1 Intel Chipset Device Software	37
3.2 Intel Graphic Media Accelerator Driver	40
3.3 LAN Driver	43
3.4 Audio Driver	46
 Appendix-A Watchdog	 47
Appendix-B GPIO	47

Chapter 1 Product Information

This chapter introduces the product features, jumper and connector information.

1.1 Block Diagram

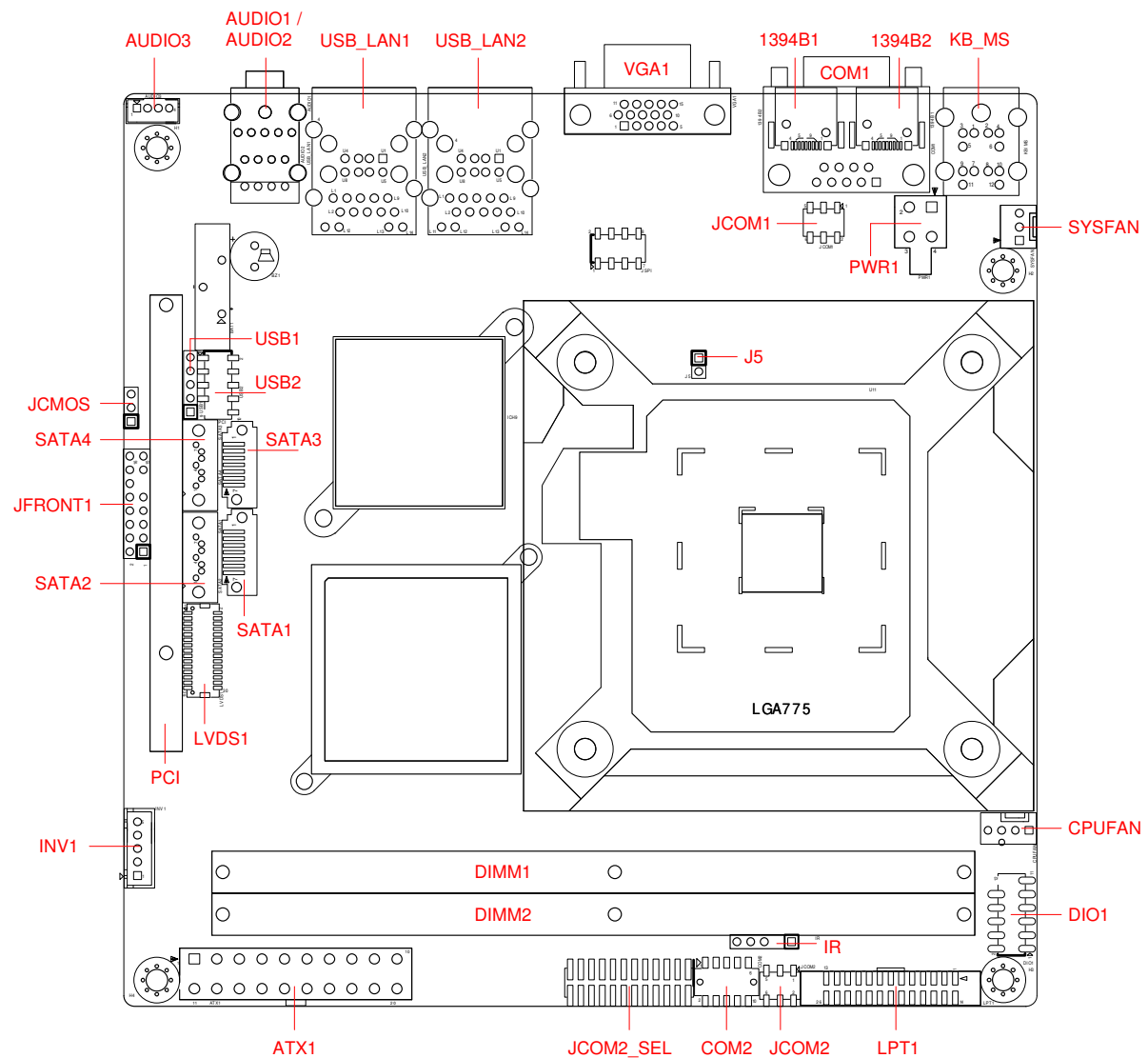


1.2 Features

System Processor / Chipset	Processor	Intel LGA775 Socket processor, Intel Core2 Quad, Core2 Duo, Celeron D
	FSB	800/1066/1333 MHz
	Chipset	Intel Q35 + ICH9
	BIOS	AWARD 32Mb SPI
Memory	Technology	Dual DDR2 667/800 SDRAM
	Max. Capacity	Up to 4GB
	Socket	2 x 240-pin DDR2 DIMM
Display	Chipset	Intel Q35 integrated GMA3100
	VRAM	Shared with 256MB system memory
	VGA Resolution	VGA: Up to 2048 x 1536@75MHz
	LVDS	Chrontel CH7308, 18/24 bit Dual Channel (Optional)
	LVDS Resolution	Up to 12080x1024 @60MHz
	Dual Display	VGA + LVDS
Ethernet	Interface	Dual 10/100/1000 Mbps
	Controller	1x Intel 82574L, 1x Intel 82567LM
Audio	Interface	High Definition Audio
	Controller	Realtek ALC662 HD CODEC
SATA	Max. Data Transfer Rates	300 MB/s
	Port	4
Expansion Slot	PCI	1
Internal Connector	LVDS	1
	USB 2.0	3
	COM	1 (RS-232/422/485)
	Parallel	1
	Audio Amplifier	1[6W(4Ω) Stereo]
	IrDA	1
	Digital IO	8Bit GPIO (4 IN + 4 OUT)

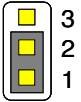
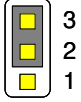
Rear I/O	PS2	1(KB/MS)
	VGA	1
	COM	1
	LAN	2(RJ-45)
	USB2.0	4
	IEEE-1394b	2
	Audio	3(MIC-In, Line-In, Line-Out)
Power	Type	ATX (20 Pin)
Watchdog Timer	Interval	Programmable 1 ~ 255 sec./min.
	Output	System reset
Environment	Operating Temp.	-5 °C ~ 60 °C (23 °F ~ 140 °F)
	Storage Temp.	-20 °C ~ 80 °C (-4 °F ~ 176 °F)
	Relative Humidity	0%~ 95% (non-condensing)
Form Factor	Dimension (L x W)	Mini-ITX (170mm x 170mm) (6.69" x 6.69)

1.3 PCB Layout

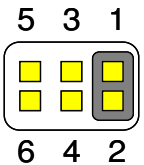
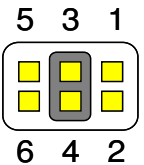
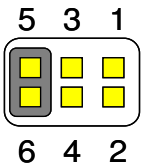


1.4 Jumper Setting

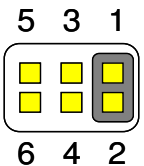
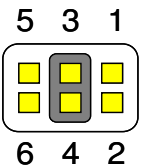
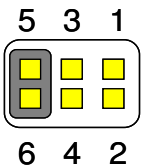
JCMOS : CMOS Clear

Pin No.	1-2	2-3
Function	Normal Operation (Default)	Clear CMOS Contents
Jumper Setting		

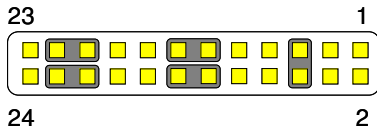
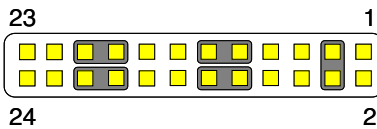
JCOM1 : COM1 (5V/12V/RI) Select

Pin No.	1-2	3-4	5-6
Function	+5V	Modem Ring In (Default)	+12V
Jumper Setting			

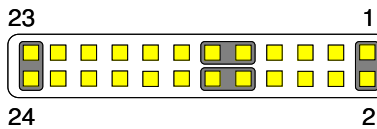
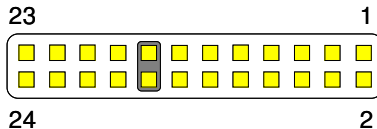
JCOM2 : COM2 (5V/12V/RI) Select

Pin No.	1-2	3-4	5-6
Function	+5V	Modem Ring In (Default)	+12V
Jumper Setting			

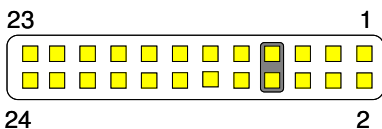
JCOM2 SEL : COM2 (RS-232/RS-422/RS-485) Select (1/3)

Pin No.	5-6, 11-13, 12-14, 19-21, 20-22	3-4, 9-11, 10-12, 17-19, 18-20
Function	RS-232 (Default)	RS-422
Jumper Setting		

JCOM2 SEL : COM2 (RS-232/RS-422/RS-485) Select (2/3)

Pin No.	1-2, 9-11, 10-12, 23-24	15-16
Function	RS-485	RS-422 RX 100Ω Termination
Jumper Setting		

JCOM2 SEL : COM2 (RS-232/RS-422/RS-485) Select (3/3)

Pin No.	7-8	
Function	RS-422 TX 100Ω / RS-485 Termination	
Jumper Setting		

J5 : CPU Support Select

Pin No.	NC	1-2
Function	Support : Wolfdale, Kentsfield and Yorkfield (Default)	Support : Legacy LGA775 CPU
Jumper Setting		

1.5 Connector Function List

Connector	Function	Note
1394B1/2	1394b Connector	
ATX1	ATX Connector	
Audio1	Line-In/ Line-Out / MIC-In Connectors	Co-Layout
Audio2	Line-Out / MIC-In Connectors	
Audio3	Amplifier Out	
CPUFAN	CPU Fan 4Pin Connector	
COM1/2	Serial Port Connectors	
DIMM1/2	DDR2 240Pin Slot	
DIO1	Digital I/O Connector	
INV1	Inverter Connector	
IR	IrDA Connector	
JFRONT1	Front Panel Connector	
KB/MS	PS2 Keyboard & Mouse Connector	
LPT1	Parallel Port Connectors	
LVDS1	LCD Connector	
PCI	PCI Slot	
PWR1	12V CPU Power Connector	
SATA1/2/3/4	SATA Connector	
SYSFAN	System Fan 3Pin Connector	
USB1	USB6 Port	
USB2	USB4/5 Port	
USB_LAN1	USB0/1 and RJ45 LAN Connector	
USB_LAN2	USB2/3 and RJ45 LAN Connector	
VGA1	CRT Connector	

1.6 Internal Connector Pin Define

AUDIO3 : Audio Amplifier Output with Wafer Connector (2.0 mm)

Pin No.	Signal
1	Audio Amplifier Out Right
2	Ground
3	Ground
4	Audio Amplifier Out Left

COM2 : Serial Port with Box-header (2.0 mm)

Pin No.	Signal	Pin No.	Signal
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI/+5V/+12V
9	Ground	10	RI/+5V/+12V

CPUFAN : CPU 4Pin FAN Connector

Pin No.	Signal
1	Ground
2	Fan Power (+12V)
3	Speed Sense
4	Control

DIO1 : Digital I/O Connector with Pin-header (2.54mm)

Pin No.	Signal	Pin No.	Signal
1	DIO-Out0	2	DIO-In0
3	DIO-Out1	4	DIO-In1
5	DIO-Out2	6	DIO-In2
7	DIO-Out3	8	DIO-In3
9	+12V	10	+5V
11	Ground	12	NC

INV1 : Inverter Connector (2.50 mm)

(Connector type: A2501WV-05P46G)

Pin No.	Signal
1	+12V
2	+12V
3	Ground
4	Inverter Brightness Control
5	Inverter Enable

IR : IR with Wafer Connector (2.54 mm)

Pin No.	Signal
1	+5V
2	NC
3	IR-RX
4	Ground
5	IR-TX

JFRONT1 : Front Panel Connector with Pin-header (2.54mm)

Pin No.	Signal	Pin No.	Signal
1	+5V (470 Ohm)	2	+5V (470 Ohm)
3	NC	4	HDD LED
5	Ground	6	5VSB (470 Ohm)
7	Reset Switch	8	Suspend LED
9	Ground	10	Speaker
11	NC	12	NC
13	Power Switch	14	NC
15	Ground	16	Ground

LPT1 : Parallel Port Connector with Box-header (2.0 mm)

Pin No.	Signal	Pin No.	Signal
1	Strobe#	14	Auto Form Feed#
2	Data 0	15	Error#
3	Data 1	16	Initialization#
4	Data 2	17	Printer Select IN#
5	Data 3	18	Ground
6	Data 4	19	Ground
7	Data 5	20	Ground
8	Data 6	21	Ground
9	Data 7	22	Ground
10	Acknowledge#	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	Ground

LVDS1 : LVDS Panel Signal with Wafer Connector (1.0 mm)

(Connector type: A1001WV-SF-2X15PD01)

Pin No.	Signal	Pin No.	Signal
1	Ground	2	Ground
3	Data A3+	4	Data A3-
5	Clock A+	6	Clock A-
7	Data A2+	8	Data A2-
9	Data A1+	10	Data A1-
11	Data A0+	12	Data A0-
13	Ground	14	Ground
15	Data B3+	16	Data B3-
17	Clock B+	18	Clock B-
19	Data B2+	20	Data B2-
21	Data B1+	22	Data B1-
23	Data B0+	24	Data B0-
25	Ground	26	Ground
27	LVDS Power	28	LVDS Power
29	LVDS Power	30	LVDS Power

Note : LVDS Power = +5V or +3.3V (Default)

SYSFAN : System FAN 3Pin Connector

Pin No.	Signal
1	Ground
2	Fan Power (+12V)
3	Speed Sense

USB1 : USB6 Port Connector with Pin Header (2.54 mm)

Pin No.	Signal
1	USB Power (+5V)
2	USB DATA6-
3	USB DATA6+
4	USB Ground
5	Case Ground

USB2 : USB4/5 Port Connector with Wafer-header (2.54 mm)

Pin No.	Signal	Pin No.	Signal
1	USB Power (+5V)	2	USB Power (+5V)
3	USB DATA4-	4	USB DATA5-
5	USB DATA4+	6	USB DATA5+
7	USB Ground	8	USB Ground
9	NC	10	Case Ground

Chapter 2 BIOS Setup

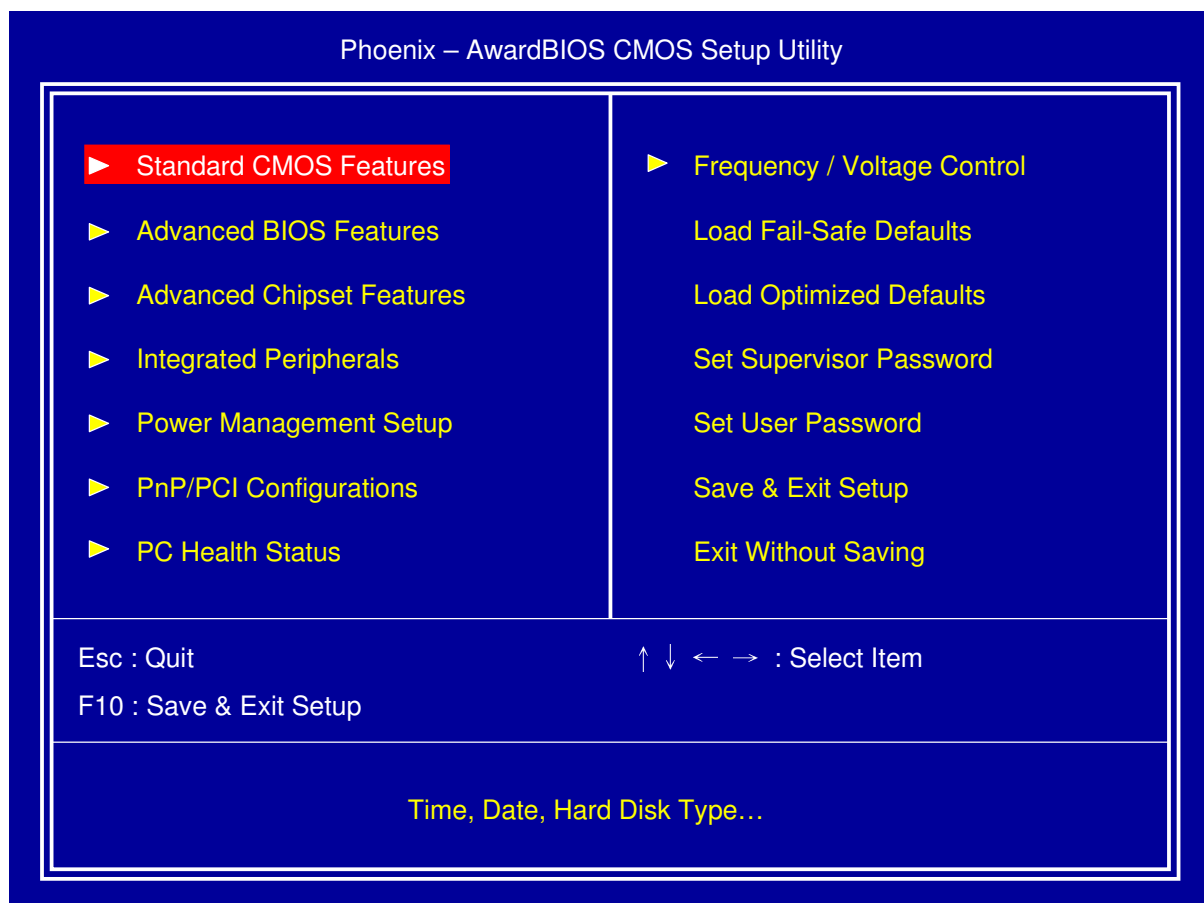
This chapter introduces BIOS setup information.

Power on or reboot the system board, when screen appears message as “Press DEL to enter SETUP“. Press <DEL> key to run BIOS SETUP Utility.

Note: The BIOS configuration for reference only, it may subject to change without prior notice.

2.1 Main Menu

Please use arrow keys to select item, then press <Enter> key to accept or enter the sub-menu.



2.2 Standard CMOS Features

Phoenix – AwardBIOS CMOS Setup Utility
Standard CMOS Features

		Item Help
Date (mm:dd:yy)	Mon, Aug 3 2009	
Time (hh:mm:ss)	11 : 12 : 20	
▶ IDE Channel 0 Master	[None]	Menu Level ▶
▶ IDE Channel 0 Slave	[None]	Change the day, month, year and century
▶ IDE Channel 1 Master	[None]	
▶ IDE Channel 1 Slave	[None]	
▶ IDE Channel 2 Master	[None]	
▶ IDE Channel 3 Master	[None]	
Video	[EGA / VGA]	
Halt On	[All , But Keyboard]	
Base Memory	639K	
Extended Memory	513024K	
Total Memory	514048K	

↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1: General Help
 F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

☐ **Date**

Setting system date

☐ **Time**

Setting system time

☐ **IDE Channel 0/1/2/3 Master**

Press <Enter> for IDE device automatic detection

☐ **IDE Channel 0/1 Slave**

Press <Enter> for IDE device automatic detection

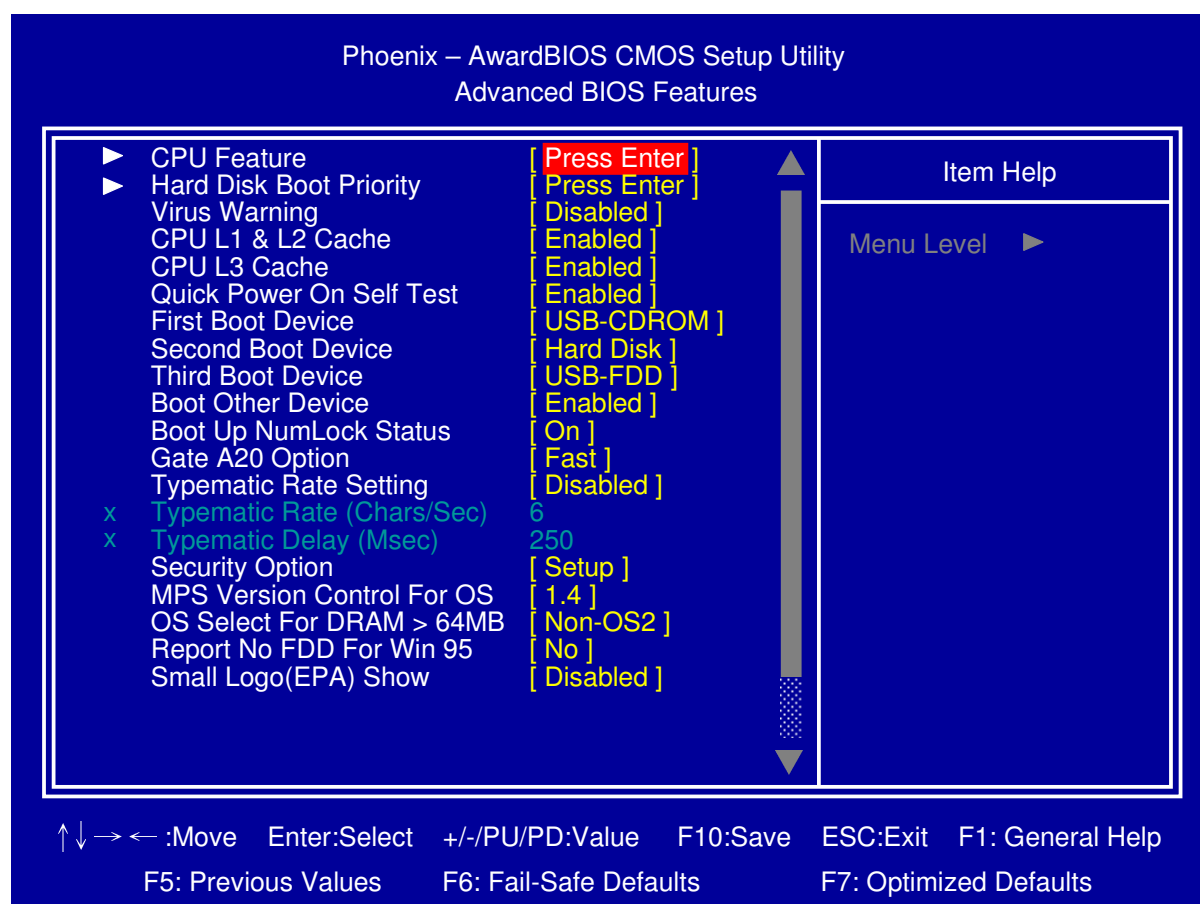
☐ **Video**

Select EGA or VGA

☐ Halt on

Select stop procedure or ignore when error detected during POST (Power On Self Test)

2.3 Advanced BIOS Features



☐ CPU Feature

Press <Enter> to select CPU parameter

☐ Hard Disk Boot Priority

Press <Enter> to select HDD devices boot sequence

☐ Virus Warning

Select "Virus Warning" Enabled/Disabled

☐ CPU L1 & L2 Cache

Select "CPU L1 & L2 Cache" Enabled/Disabled

☐ **CPU L3 Cache**

Select "CPU L3 Cache" Enabled/Disabled

☐ **Quick Power On Self Test**

Select "Quick Power On Self Test" Enabled/Disabled

☐ **First/Second/Third Boot Device**

Select device boot sequence

☐ **Boot Other Device**

Select "Boot Other Device" Enabled/Disabled

☐ **Boot Up NumLock Status**

Select <NumLock> key ON/Off when system boot up.

☐ **Gate A20 Option**

Select Gate A20 controlled by Keyboard controller (Normal) or Port 92 (Fast)

☐ **Typematic Rate Setting**

Select "Typematic Rate Setting" Enabled to set

Typematic Rate (Chars/Sec): Number of characters repeated in one second.

Typematic Delay (Msec): When holding one key, set the time between the first and second character displayed.

☐ **Security Option**

Select Security Option mode,

Setup: Require password to permit BIOS setup utility

System: Require password to permit boot-up and BIOS setup utility

☐ **MPS Version Control For OS**

Select MPS (Multiprocessor Specification) Version 1.4 to added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability. It is also required for a secondary PCI bus to work without the need for a bridge. Select Version 1.1 for older Operating Systems.

☐ **OS Select For DRAM > 64M**

Select "OS2" only if you are running older version of IBM OS/2 Operating System with greater than 64MB of RAM on the system. Otherwise select "Non-OS/2" setting.

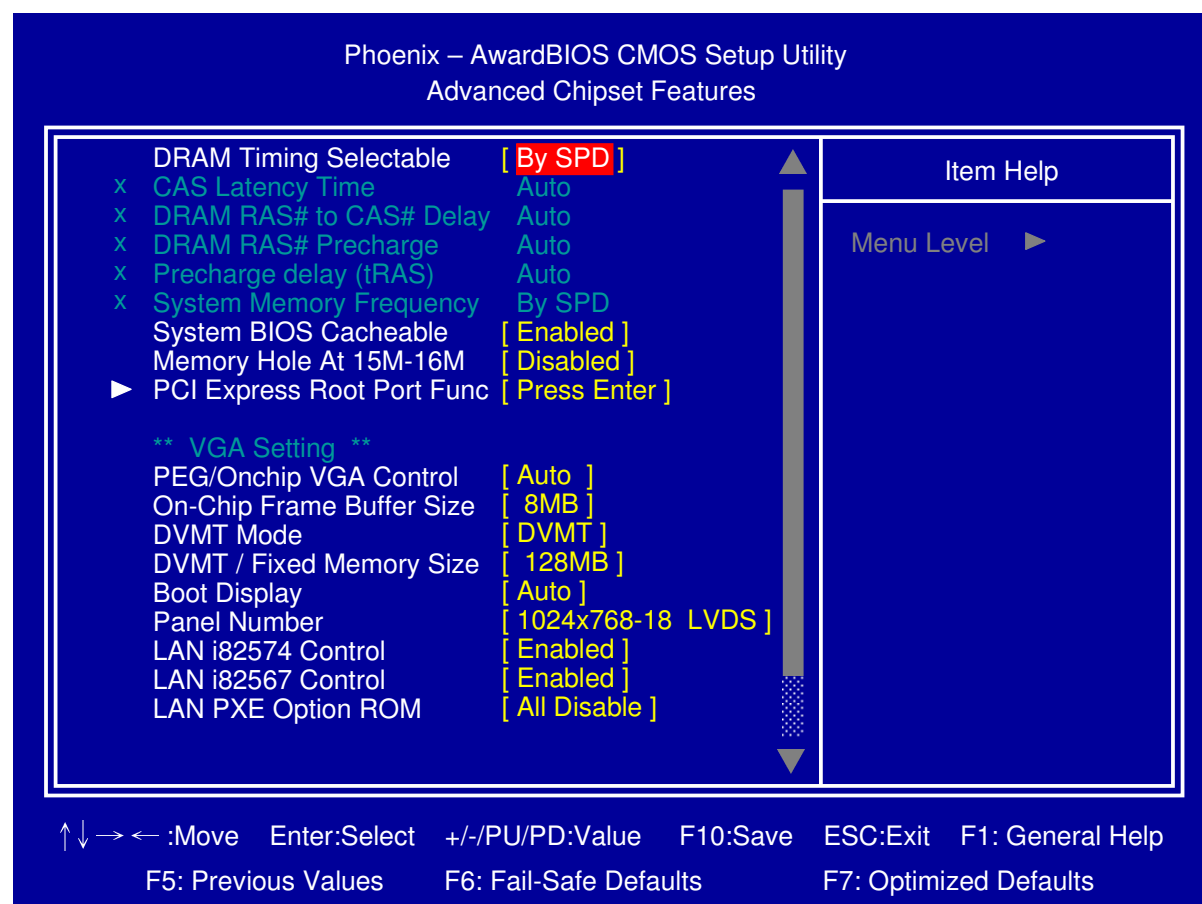
☐ **Report No FDD For WIN 95**

If running Windows 95/98 without floppy disk drive, select "Enabled" to release IRQ6. This is required to pass Windows 95/98's SCT test, If select "Disabled", BIOS will not report missing floppy drive to Win95/98.

☐ **Small Logo(EPA) Show**

Select EPA (Environmental Protection Agency) Energy Star logo appears during the system boot-up process.

2.4 Advanced Chipset Features



☐ DRAM Timing Selectable

Select DRAM timing by SPD (Serial Presence Detect) or manual

☐ SLP_S4# Assertion Width

Select the minimum assertion width of the SLP-S4# signal to guarantee the DRAM has been safely power-cycled.

☐ System BIOS Cacheable

Select Enabled to caching of the system BIOS at F0000h-FFFFFh, resulting in better system performance. However, if any program is written to this memory area, the system error may result.

☐ Video BIOS Cacheable

Select Enabled to caching of the video BIOS at C0000h-F7FFFh, resulting in better video performance. However, if any program is written to this memory area, the system error may result.

☐ **Memory Hole At 15M-16M**

Select Enabled to improve performance, certain space in memory can be reserved for ISA cards. The memory must be mapped into the memory space below 16 MB.

☐ **PCI Express Root Port Func**

Press <Enter> to setting PCI Express function

☐ **PEG/Onchip VGA Control**

Select VGA control by PEG (PCI-Express Graphic) or onboard chipset

☐ **On-Chip Frame Buffer Size**

Select share system memory 8MB or 16MB

☐ **DVMT Mode**

DVMT (Dynamic Video Memory Technology) allowing the system to dynamically allocate memory resources according to the demands of the system at any point in time, that improve efficiency of the memory allocated to either system or graphics processor.

☐ **DVMT/Fixed Memory Size**

Select DVMT/Fixed Memory Size 64MB/128MB/224MB

☐ **Boot Display**

Select which device to display

☐ **Panel Number**

Select LCD panel type

☐ **LAN i82574 Control**

Select Intel 82574 LAN Enabled/Disabled

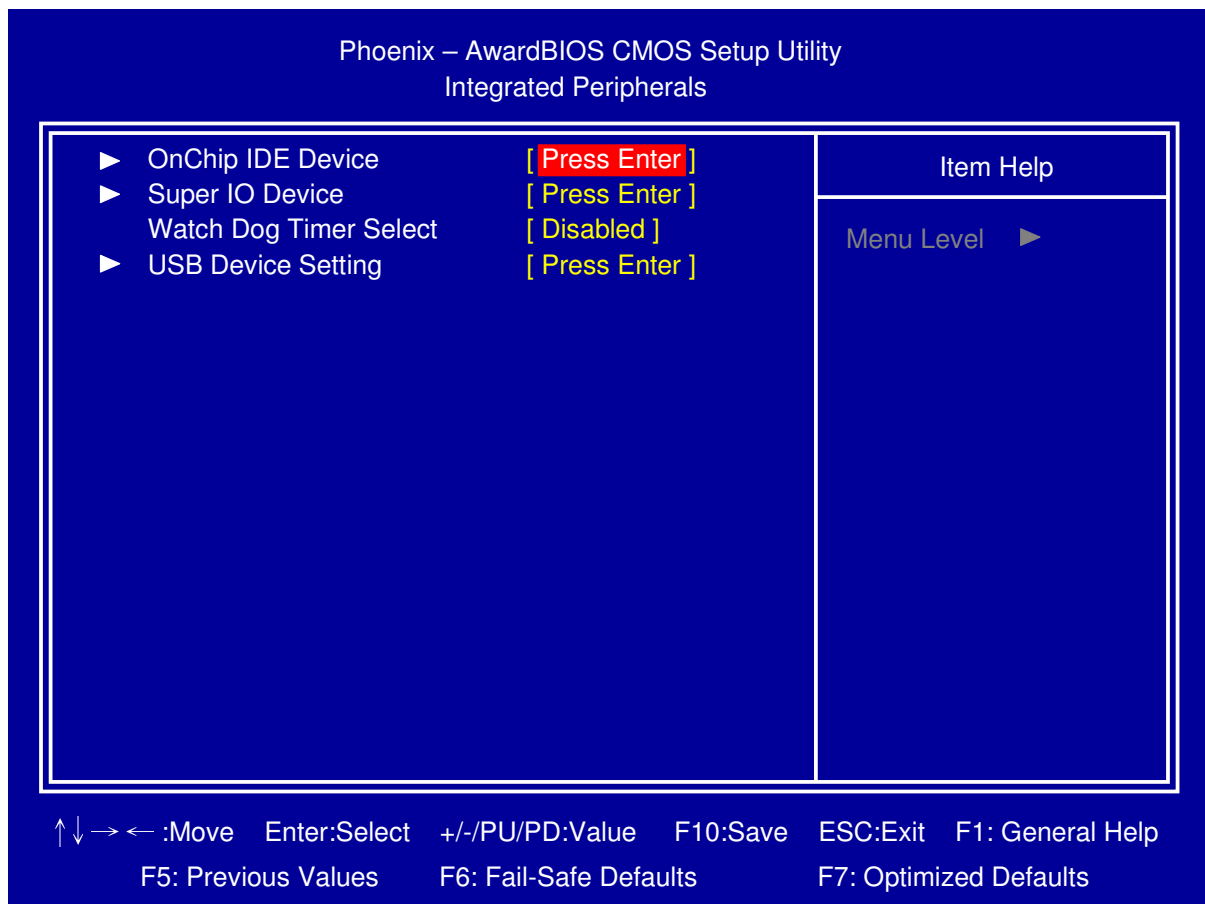
☐ **LAN i82567 Control**

Select Intel 82567 LAN Enabled/Disabled

☐ **LAN PXE Option ROM**

Select PXE (Preboot Execution Environment) Option ROM Enabled/Disabled/Device

2.5 Integrated Peripherals



☐ OnChip IDE Device

Set IDE and SATA device configuration

Phoenix – AwardBIOS CMOS Setup Utility

OnChip IDE Device

IDE HDD Block Mode	[Enabled]	Item Help
IDE Primary Master PIO	[Auto]	
IDE Primary Slave PIO	[Auto]	Menu Level ▶ If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support
IDE Primary Master UDMA	[Auto]	
IDE Primary Slave UDMA	[Auto]	
On-Chip Secondary PCI IDE	[Enabled]	
IDE Secondary Master PIO	[Auto]	
IDE Secondary Slave PIO	[Auto]	
IDE Secondary Master UDMA	[Auto]	
IDE Secondary Slave UDMA	[Auto]	
SATA Mode	[IDE]	
LEGACY Mode Support	[Disabled]	

↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

☐ Super IO Device

Select Serial, Parallel and “PWRON After PWR-Fail” configuration

Phoenix – AwardBIOS CMOS Setup Utility		
Super IO Device		
Onboard Serial Port 1	[3F8/IRQ4]	Item Help Menu Level ►
Onboard Serial Port 2	[2F8/IRQ3]	
UART Mode Select	[Normal]	
x RxD , TxD Active	Hi , Lo	
x IR Transmission Delay	Enabled	
x UR2 Duplex Mode	Half	
x Use IR Pins	IR-Rx2Tx2	
Onboard Parallel Port	[378/IRQ7]	
Parallel Port Mode	[SPP]	
x EPP Mode Select	EPP1.7	
x ECP Mode Use DMA	3	
PWRON After PWR-Fail	[Off]	

↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

☐ Watch Dog Timer Select

Select Watch dog Disabled or set timer value.

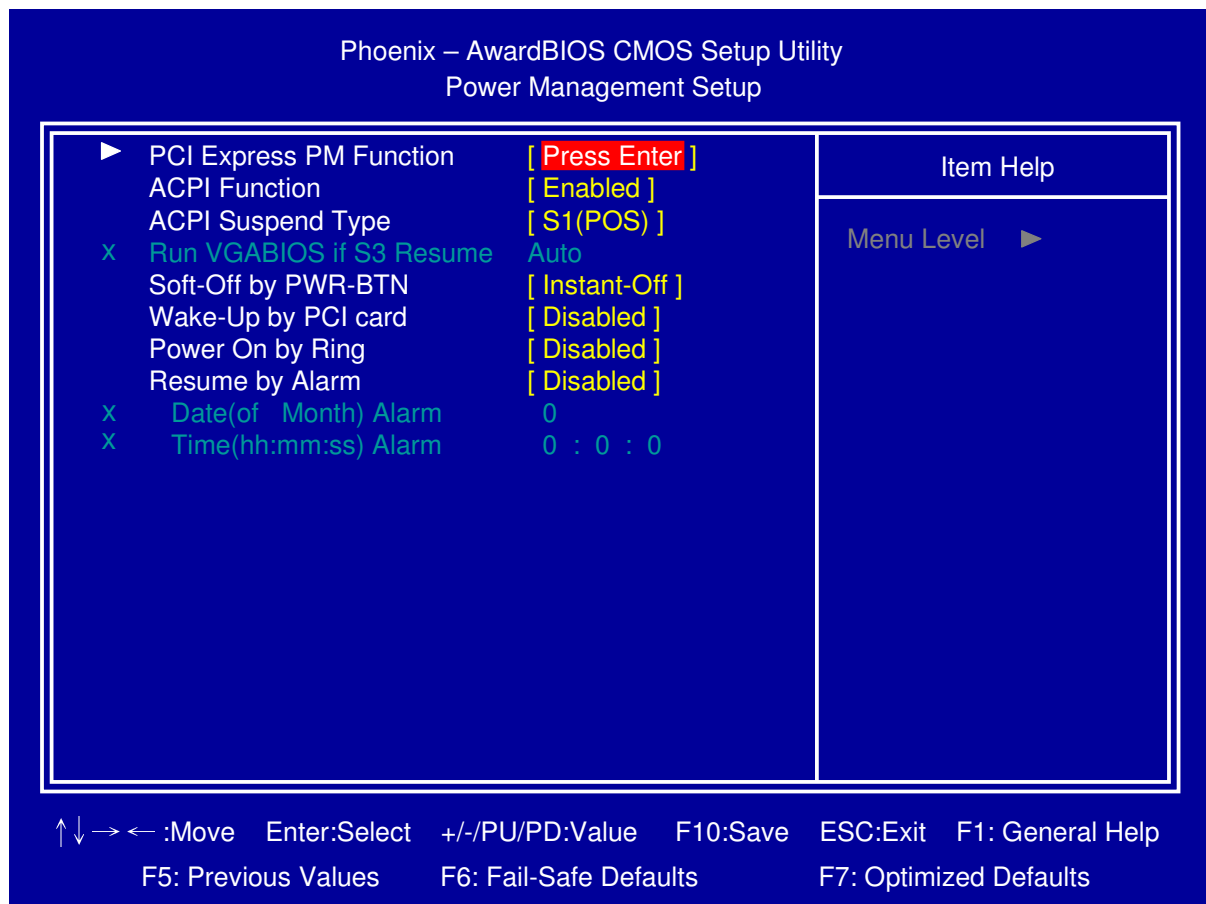
☐ USB Device Setting

Select USB device configuration

Phoenix – AwardBIOS CMOS Setup Utility	
USB Device Setting	
USB 1.0 Controller	[Enabled]
USB 2.0 Controller	[Enabled]
USB Operation Mode	[High Speed]
USB Keyboard Function	[Enabled]
USB Mouse Function	[Enabled]
USB Storage Function	[Enabled]
*** USB Mass Storage Device Boot Setting ***	
Item Help	
Menu Level ►	
[Enable] or [Disable]	
Universal Host	
Controller Interface	
for Universal Serial	
Bus.	

↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

2.6 Power Management Setup



☐ PCI Express PM Function

Press <Enter> to select “Wake-up by LAN” Enabled/Disabled

☐ ACPI Function

Select ACPI (Advanced Configuration and Power Management) function
Enabled/Disabled

☐ ACPI Suspend Type

Select S1(POS)/S3(STR)/S1&S3

☐ Soft-Off by PWR_BTN

Select power button function

Instant-off: Press power button will power off instantly

Delay 4 Sec: Press power button 4 second to power off

☐ **Wake-UP by PCI card**

Select Wake-UP by PCI device Enabled/Disabled

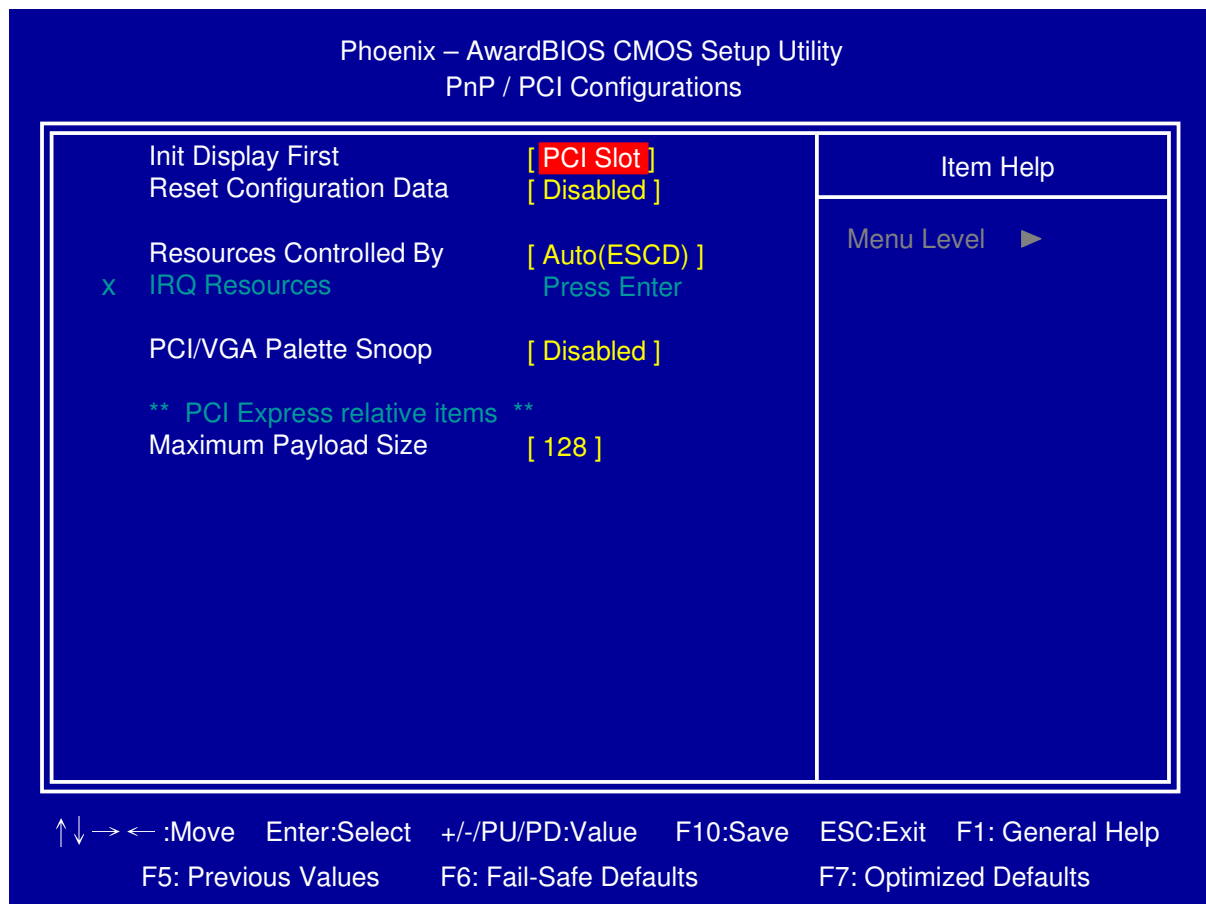
☐ **Power On by Ring**

Select Power on by Ring Indicator signal from Modem.

☐ **Resume by Alarm**

Set date and time to power on system from soft-off state.

2.7 PnP/PCI Configurations



☐ Init Display First

Select initial display by PCI or Onboard device.

☐ Reset Configuration Data

Select Enabled to reset Extended System Configuration Data (ESCD) when you exit BIOS setup utility, if you have installed new add-on card and the system reconfiguration has caused such a serious conflict that the OS cannot boot.

☐ Resources Controlled By

Select resources controlled by automatic or manual.

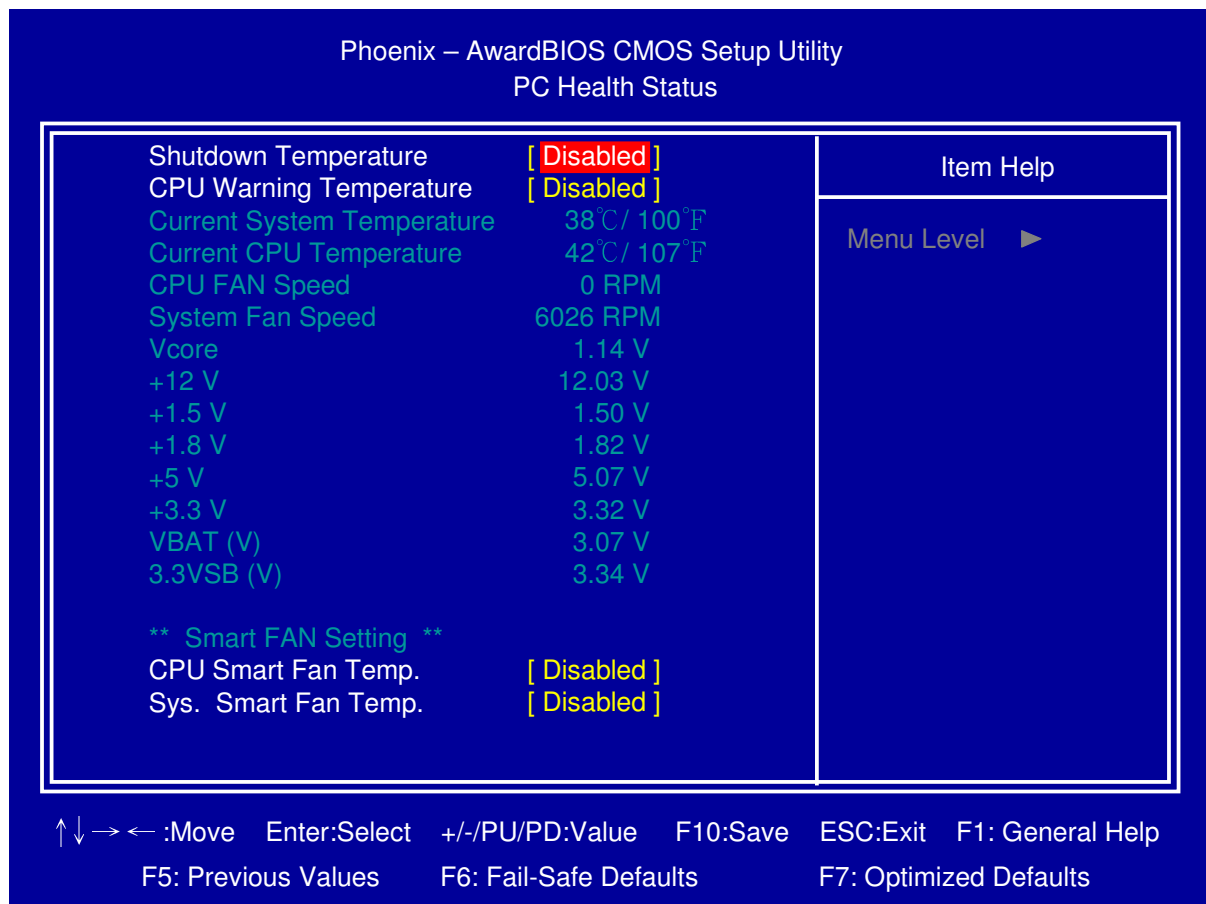
☐ PCI/VGA Palette Snoop

Select PCI/VGA Palette Snoop Enabled/Disabled

☐ Maximum Payload Size

Setup maximum payload size for PCI Express devices.

2.8 PC Health Status



☐ Shutdown Temperature

If CPU temperature reaches the setting value will automatic shutdown system

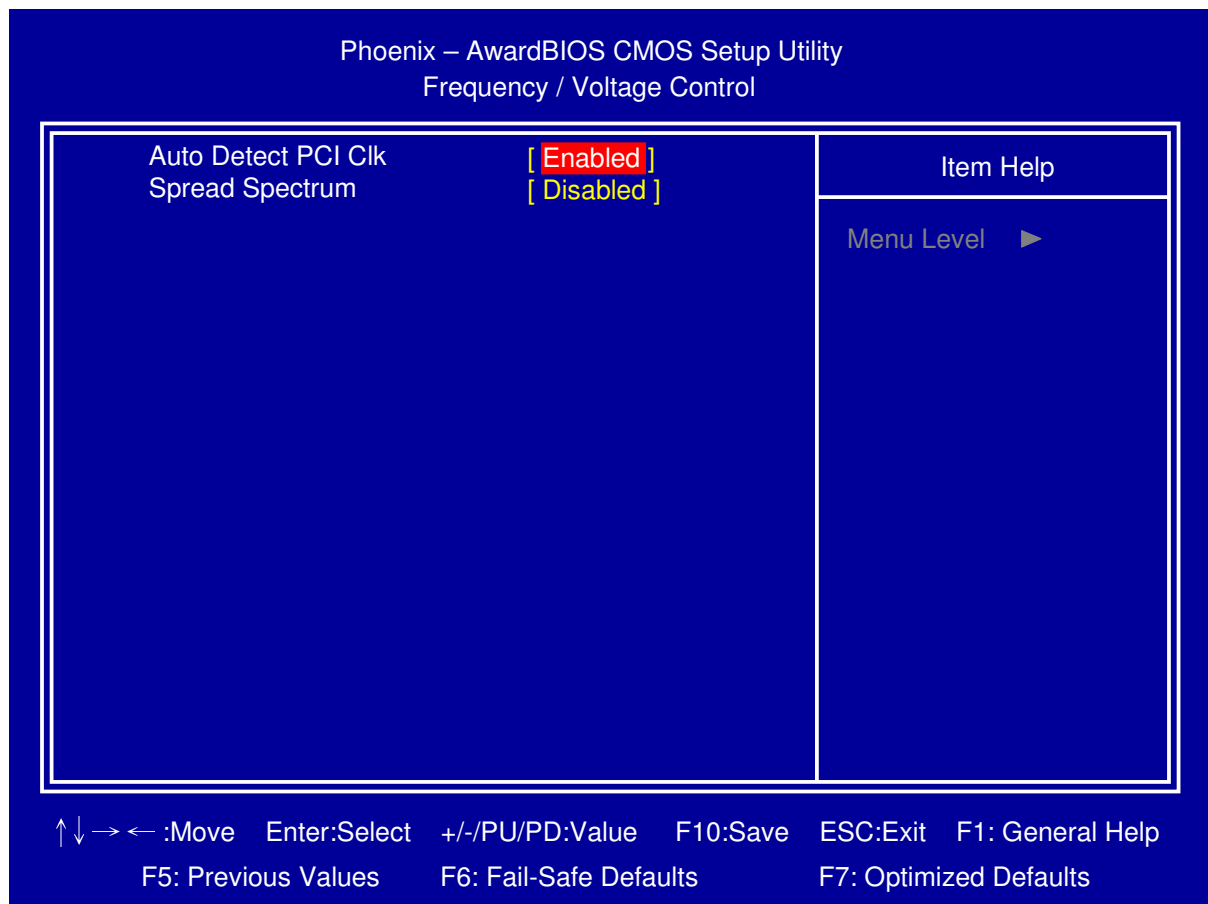
☐ CPU Warning Temperature

If CPU temperature reaches the setting value will beep in DOS mode.

☐ CPU/Sys. Smart Fan Temp.

Setup CPU/System Smart FAN temperature

2.9 Frequency/Voltage Control



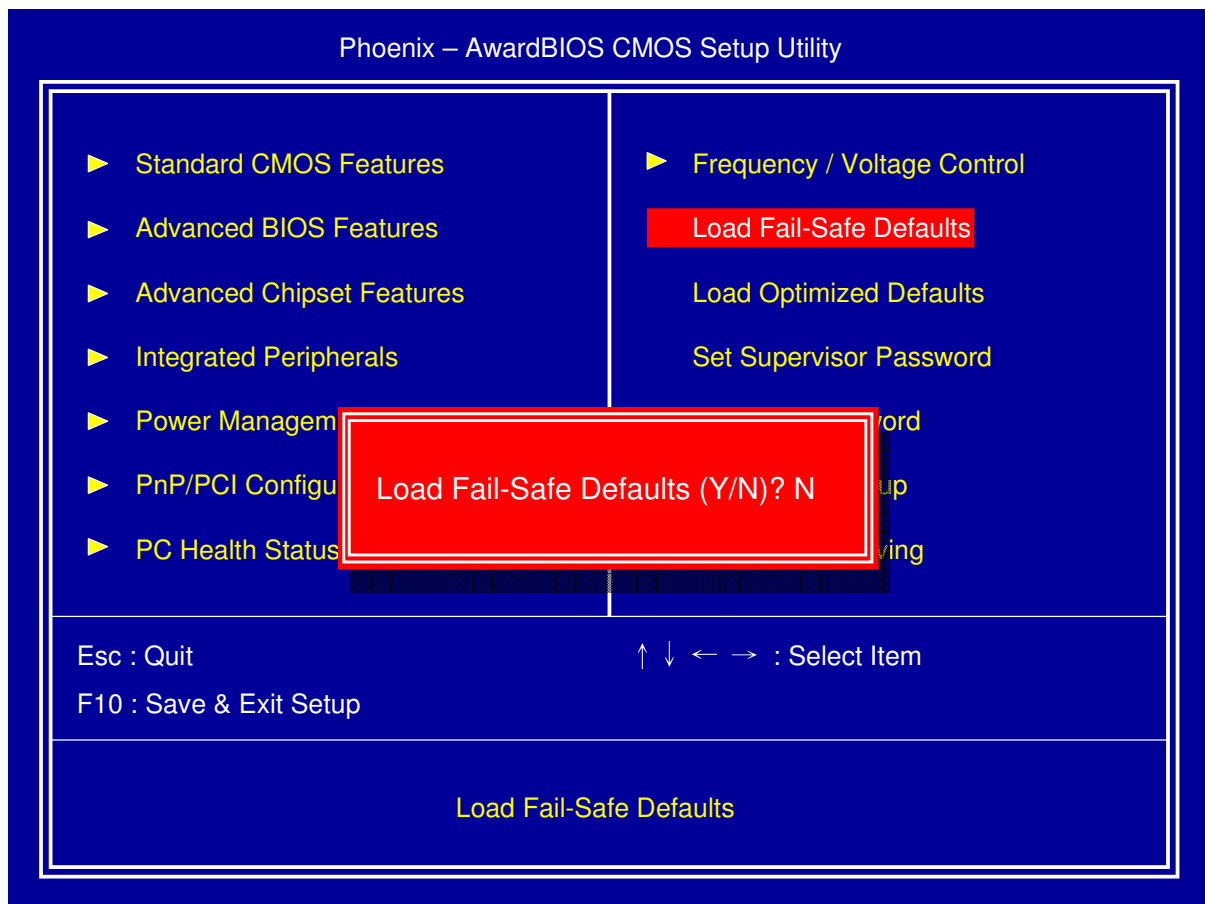
☐ Auto Detect PCI Clk

Select "Auto Detect PCI Clk" Enabled/Disabled

☐ Spread Spectrum

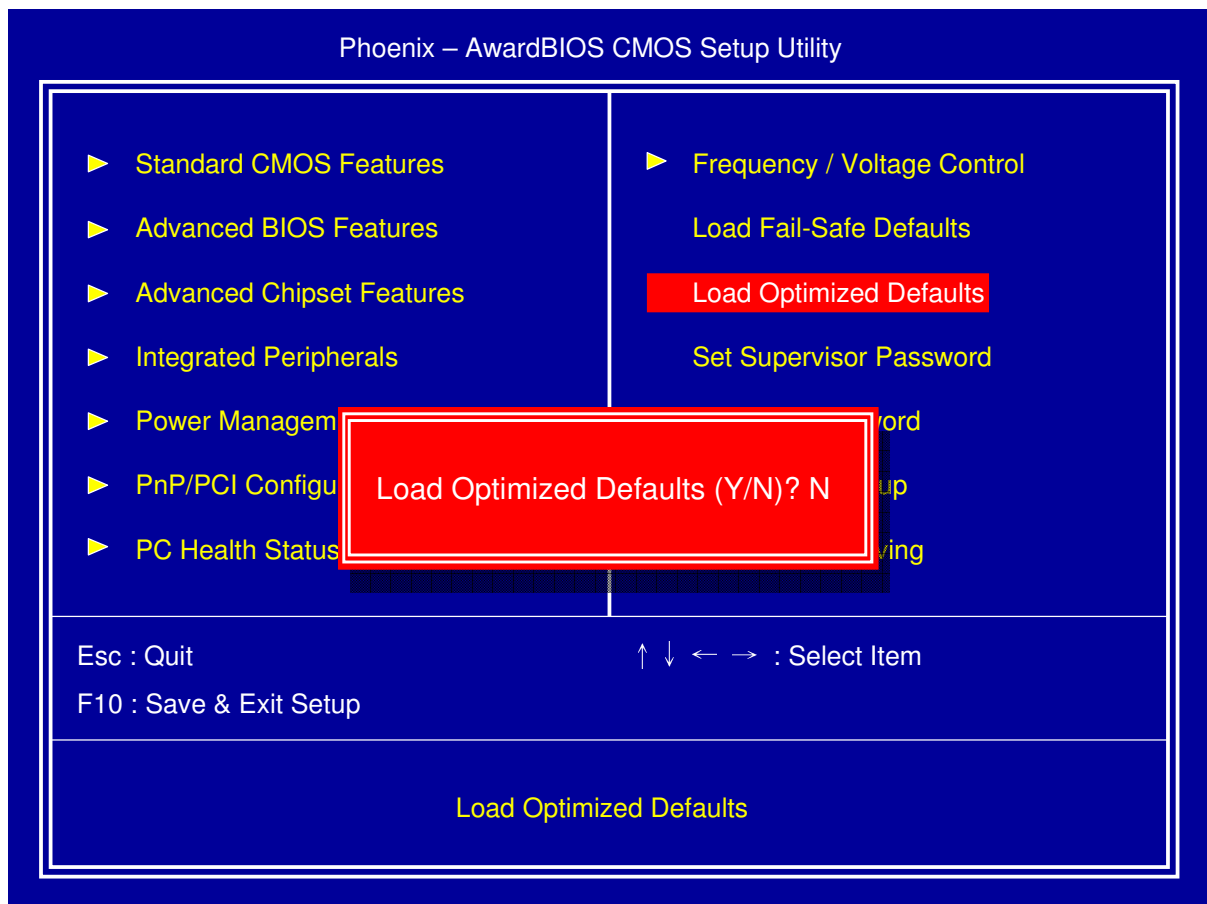
Select "Spread Spectrum" Enabled/Disabled

2.10 Load Fail-Safe Defaults



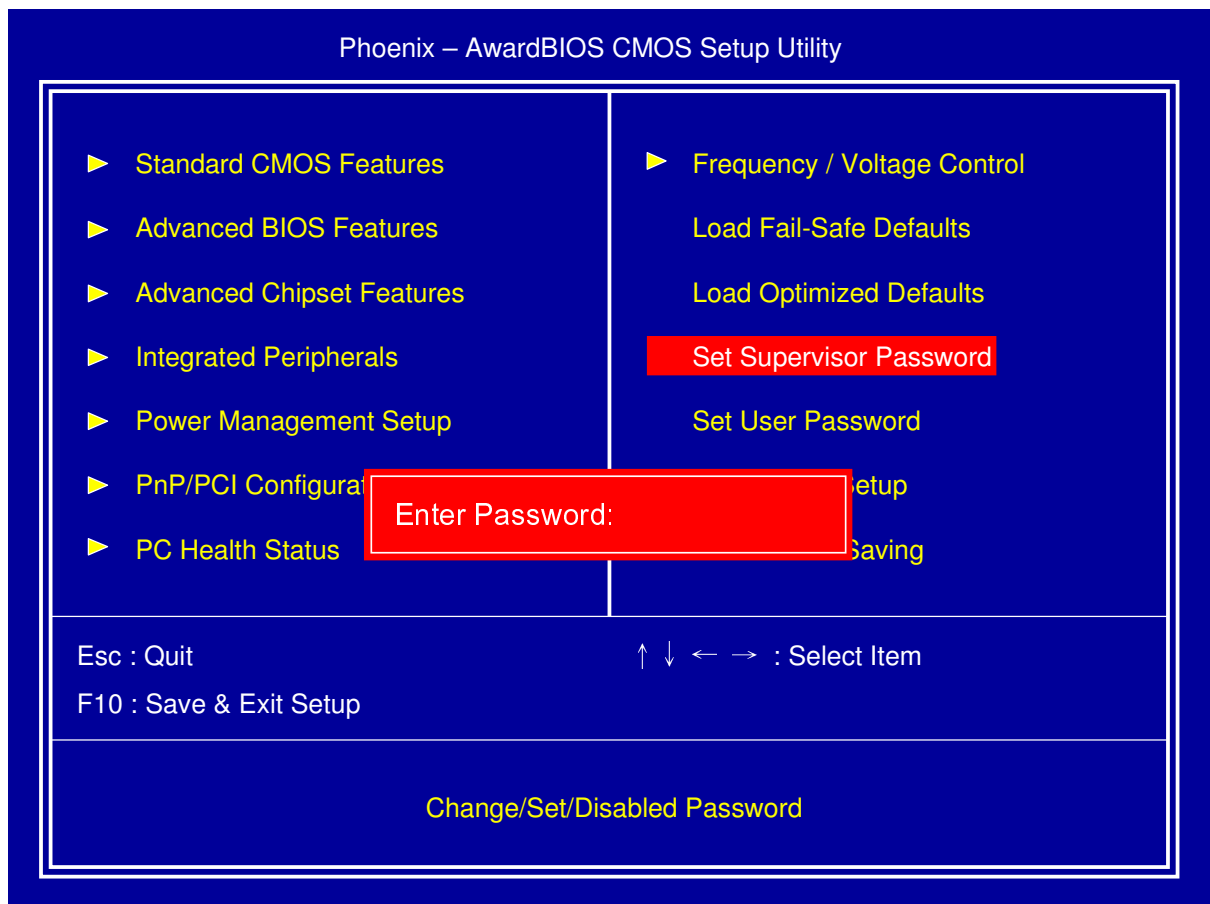
This item will set configuration for non optimized system operation.

2.11 Load Optimized Defaults



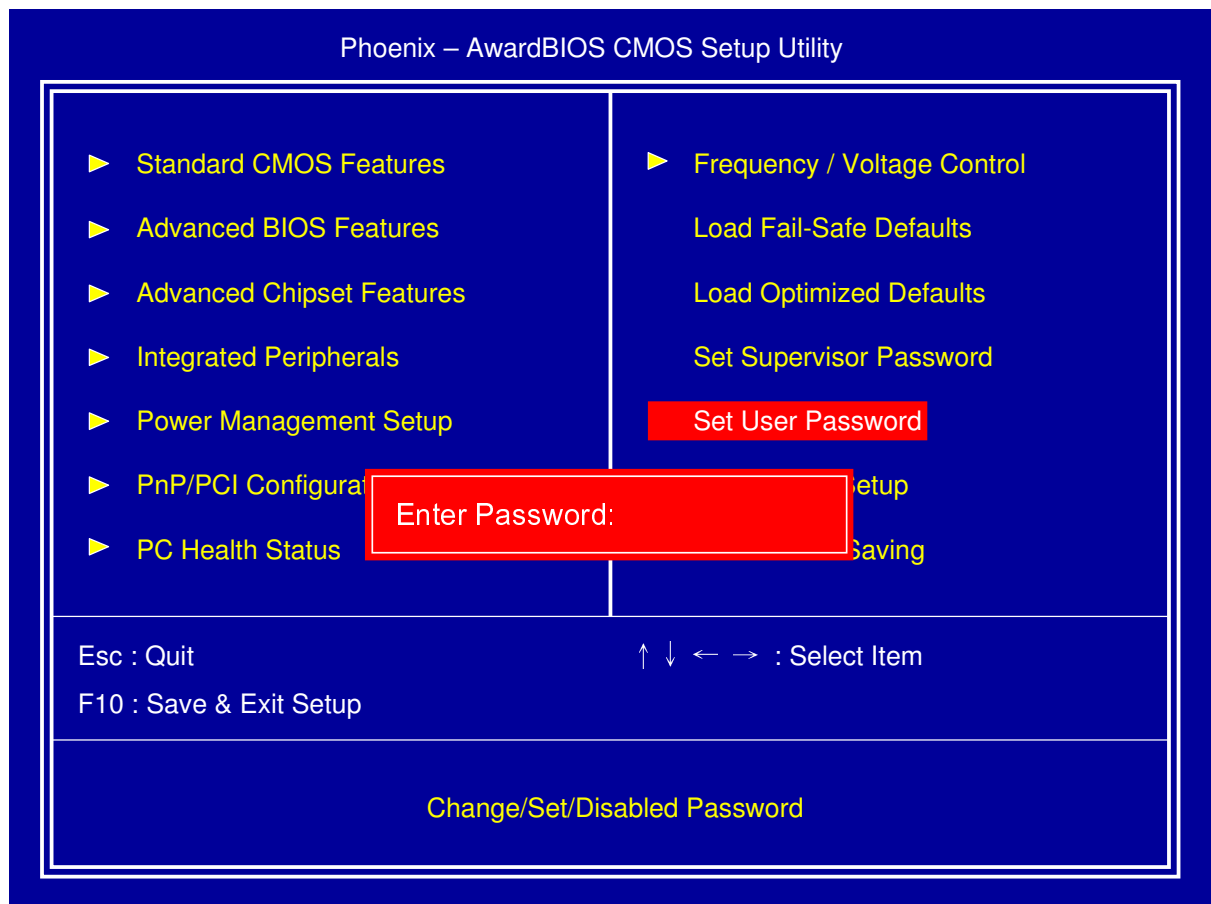
This item will restore factory default setting for optimized system operation.

2.12 Set Supervisor Password



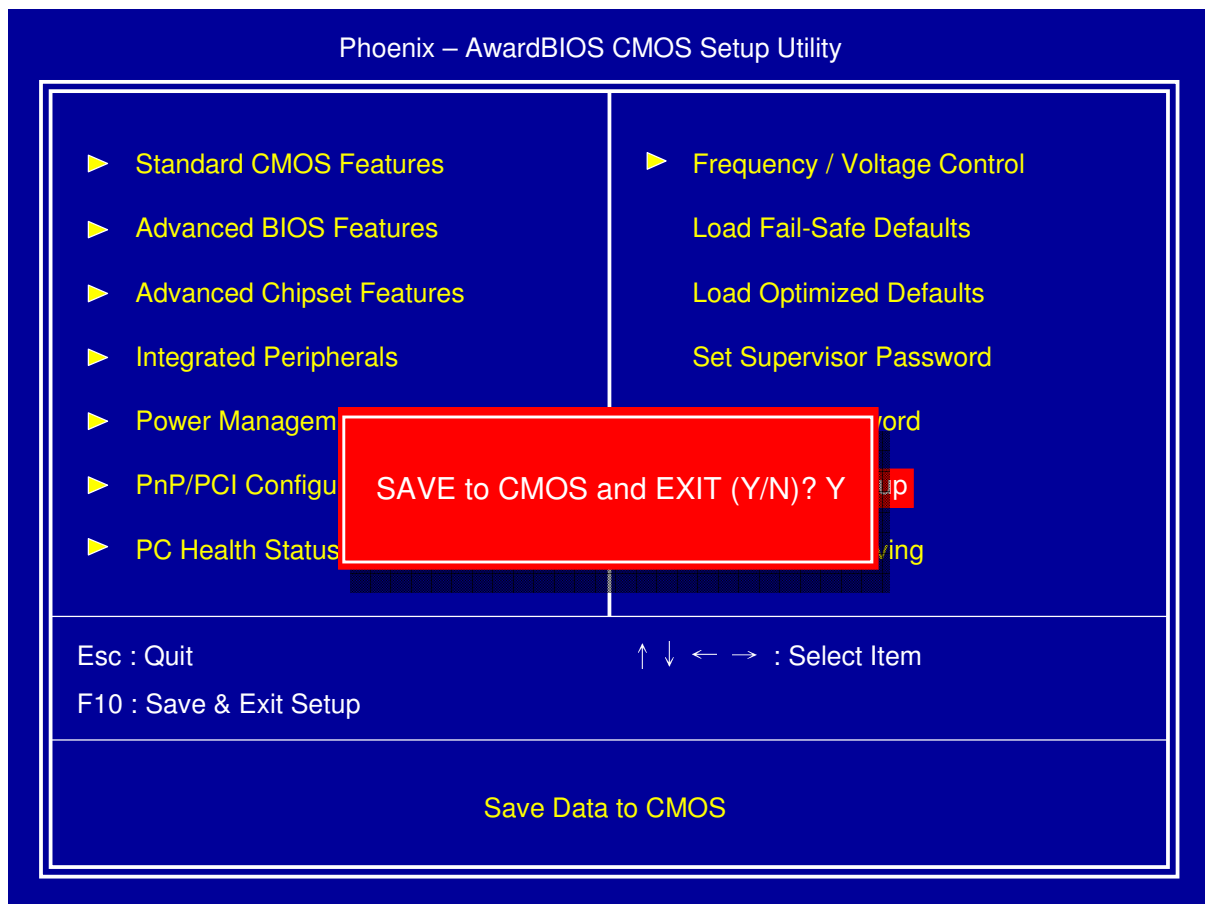
If set supervisor password, it will request typing password before entering BIOS setup utility.

2.13 Set User Password



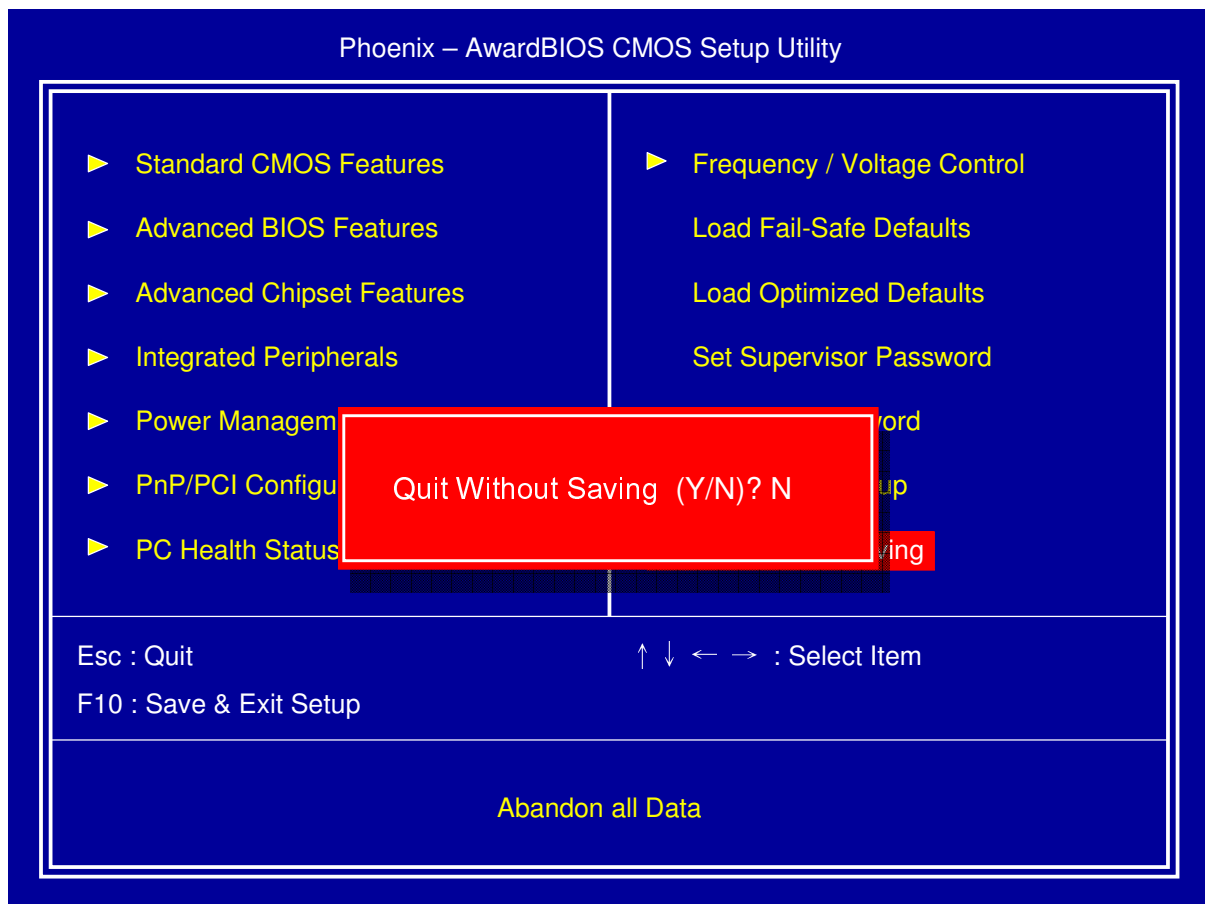
If set user password will request typing password to enter BIOS setup utility, and does not allow modifying configuration.

2.14 Save & Exit Setup



This item confirm save configuration or not before exit BIOS setup utility,
Press <Y> and <Enter> to save configuration, then reboot system.
Press <N> and <Enter> will back to BIOS setup utility.

2.15 Exit Without Saving



This item confirm save configuration or not before quit BIOS setup utility, Press <Y> and <Enter> will not save configuration, then reboot system. Press <N> and <Enter> will back to BIOS setup utility.

Chapter 3 Drivers Installation

This chapter introduces driver installation information.

Please insert the utility CD to CD-ROM drive, the install menu will appear automatically, if the install menu did not list suitable driver of Operate System or did not appear automatically, please select corresponding driver of utility CD to install.

The Windows XP driver installation steps are as below.

3.1 Intel Chipset Device Software

Step 1. Click “Next” to continue



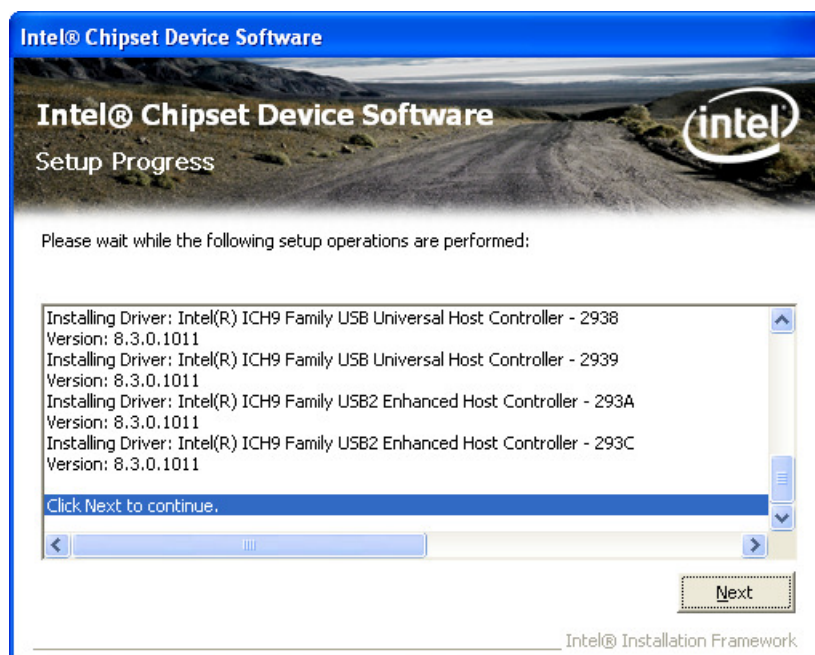
Step 2. Read the License Agreement and click “Yes” to continue



Step 3. Click “Next” to continue



Step 4. Click “Next” to continue



Step 5. Click “Finish” to complete setup

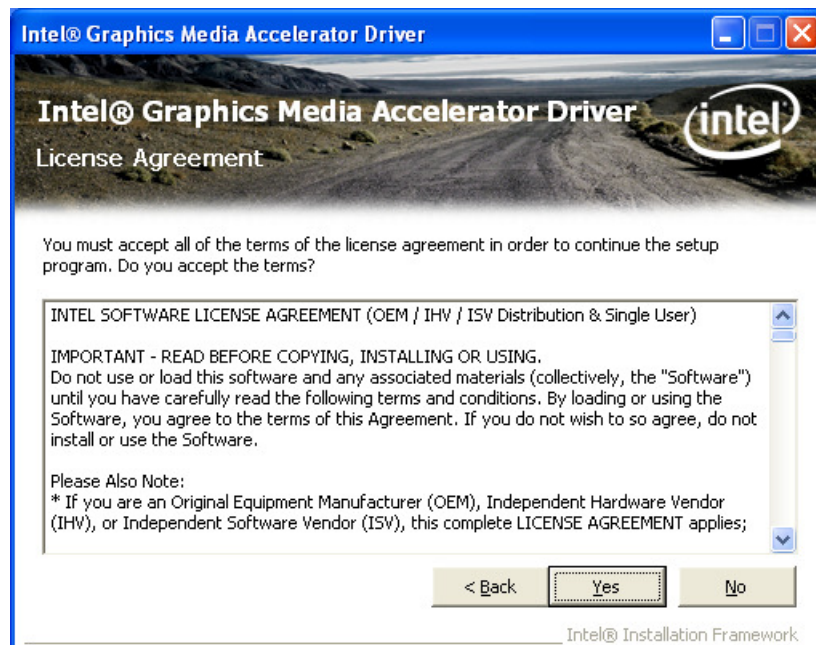


3.2 Intel Graphic Media Accelerator Driver

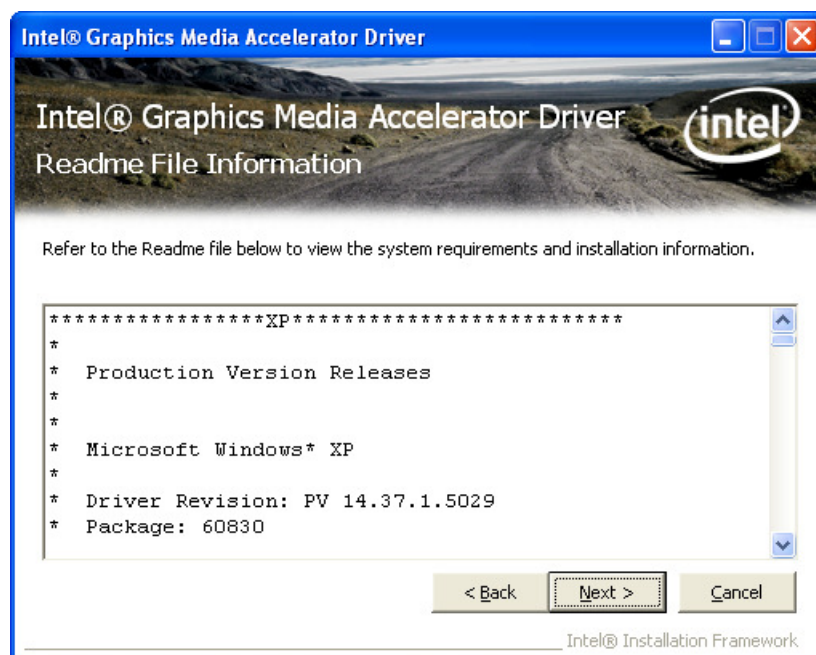
Step 1. Click “Next” to continue



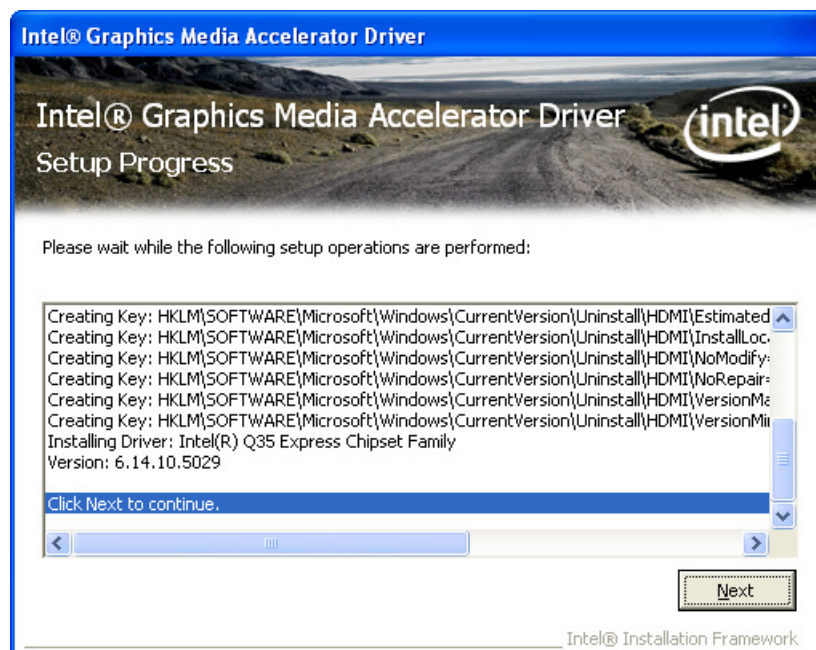
Step 2. Read the License Agreement and click “Yes” to continue



Step 3. Click “Next” to continue



Step 4. Click “Next” to continue



Step 5. Click “Finish” to complete setup

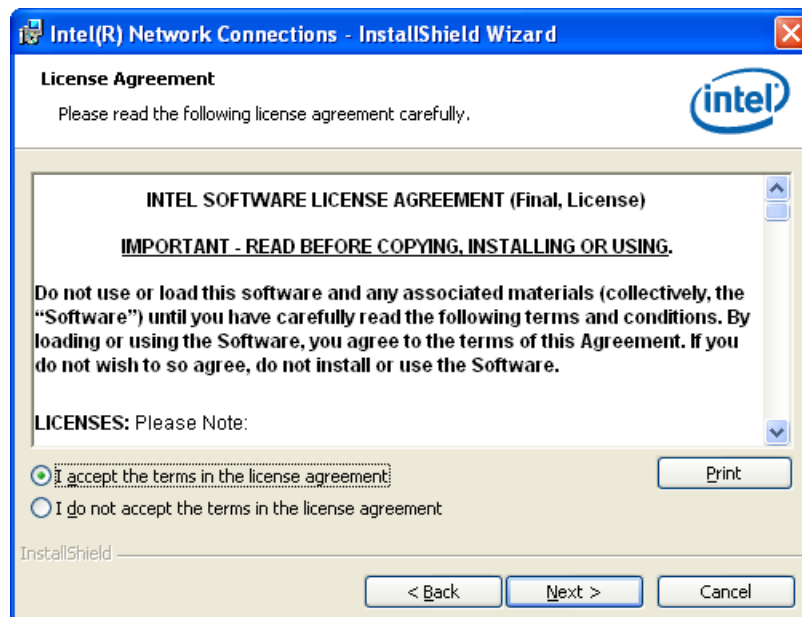


3.3 LAN Driver

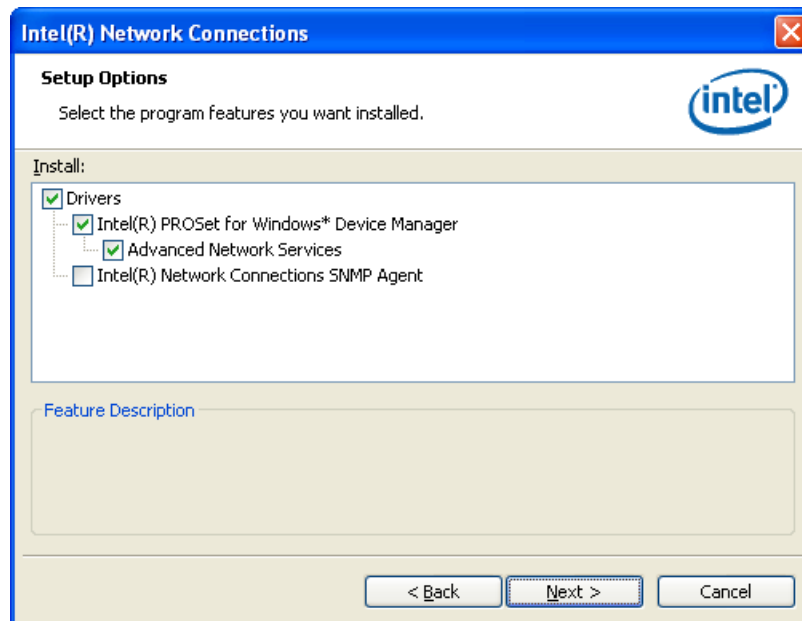
Step 1. Click “Next” to continue



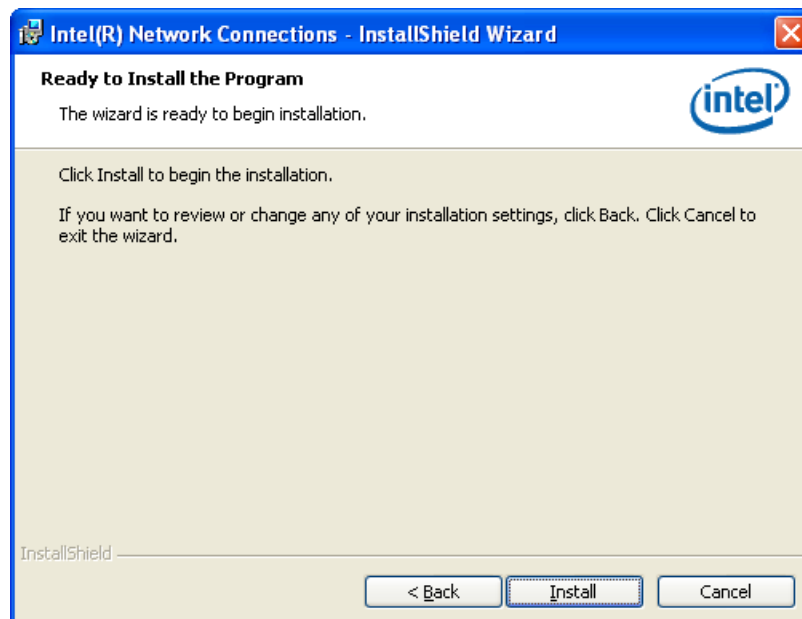
Step 2. Read the License Agreement and click “Next” to continue



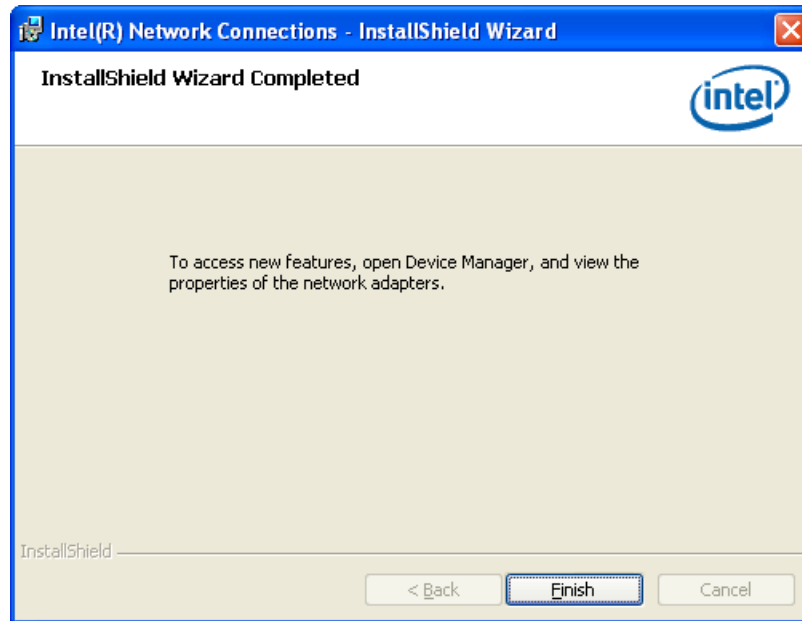
Step 3. Click “Finish” to complete setup



Step 4. Click “Install” to continue

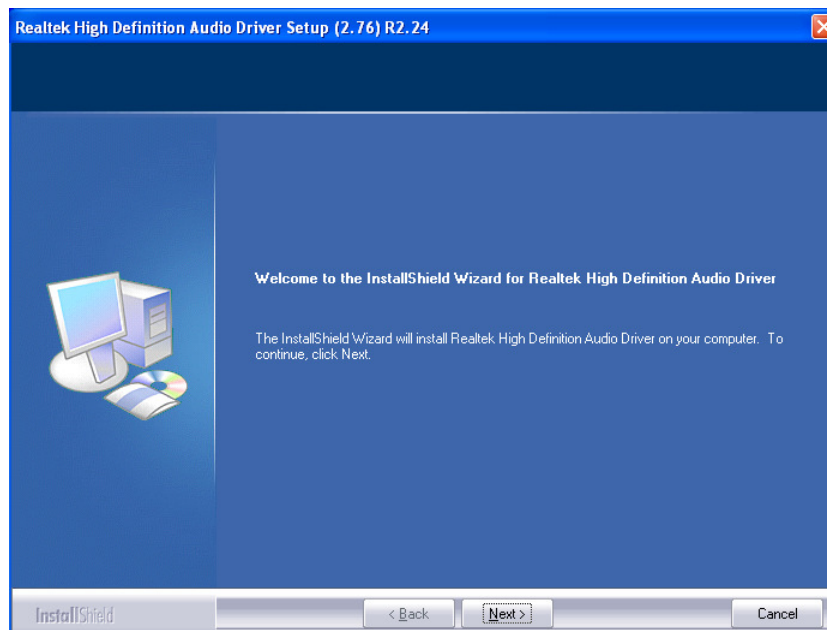


Step 5. Click “Finish” to complete setup

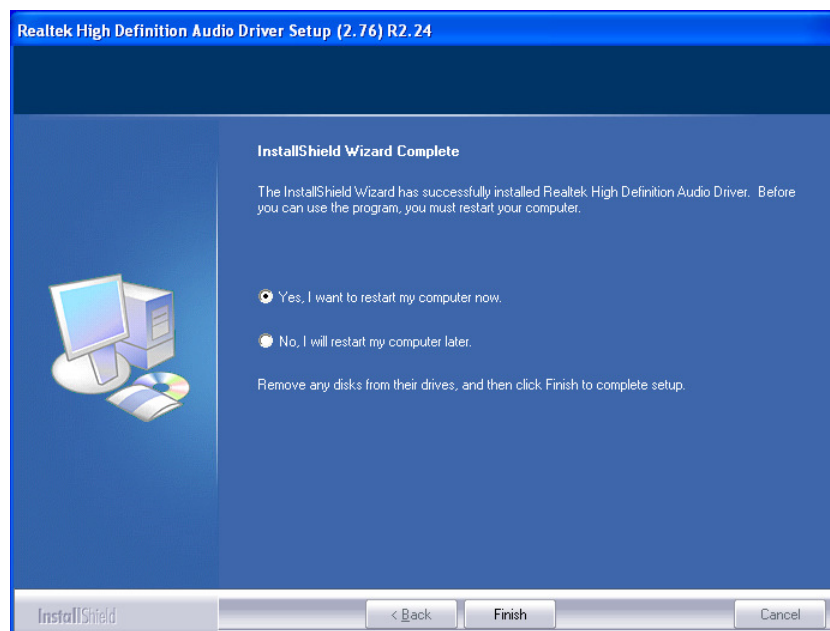


3.4 Audio Driver

Step 1. Click “Next”



Step 2. Click “Finish” to complete setup



Appendix-A Watchdog

The system board provides Watchdog function, the Super I/O setting step as below.

Step 1: CR2D, Bit0→0 (select pin77 to WDTO#)

Step 2: LD8, CR30, Bit0→1 (Active WDTO#)

Step 3: LD8, CRF7, Bit4→Write 0 to clear WDTO# status.

Step 4: LD8, CRF5, Bit3→0: Second mode, 1: Minute mode

Step 5: LD8, CRF6, Bit [7:0] →Set WDTO# Time out value. (WDTO# startup after setting the system time, or setup from step 3 ~ step 5 to restart WDT.)

Appendix-B GPIO

The system board provides input and output ports that can be individually configured to perform a simple basic I/O function. Users can configure each individual port to become an input or output port by programming register bit of I/O selection. To invert port value, the setting of Inversion Register has to be made. Port values can be set to read or write through Data Register.

Please refer previous chapter for pin define description.

Access Cash Drawer GPIO Programming Guide

There are two PNP I/O port addresses that can be used to configure GPIO ports,

- (1). 0x2E - **EFER** (Extended Function Enable Register, for entering Extended Function Mode)
 - **EFIR** (Extended Function Index Register, for identifying CR index number)
- (2). 0x2F - **EFDR** (Extended Function Data Register, for accessing desired CR)

Below are some example codes for demonstrate GPIO function.

// Enter Extended Function Mode

```
outp(0x002E, 0x87);  
outp(0x002E, 0x87);
```

// Assign Pin121-128 to be GPIO port 1

```
outp(0x002E, 0x29);  
outp(0x002F, inp(0x002F) | 0x01);
```

// Select Logic Device 7

```
outp(0x002E, 0x07);  
outp(0x002F, 0x07);
```

// Active Logic Device 7

```
outp(0x002E, 0x30);  
outp(0x002F, 0x01);
```

// Select Inversion Mode

```
outp(0x002E, 0xF2);  
outp(0x002F, 0x83);
```

// Select I/O Mode

// Bit0~bit3 output and bit4~bit7 input

```
outp(0x002E, 0xF1);  
outp(0x002F, 0x00);
```

// Access GPIO ports

```
outp(0x002E, 0xF0);  
outp(0x002F, 0x7C);
```

// Exit Extended Function Mode

```
outp(0x002E, 0xAA);
```

Definitions of Variables:

Each bit in the lower nibble of each Register represents the setting of a GPIO port.

Bit0 vs. GPIO DIO-Out 0

Bit1 vs. GPIO DIO-Out 1

Bit7 vs. GPIO DIO-Out 3

Bit4 vs. GPIO DIO-In 0

Bit3 vs. GPIO DIO-In 3

Value of **Inversion Register:**

Only lower nibble is available for this function.

When set to a '1', the incoming/outgoing port value is inverted.

When set to a '0', the incoming/outgoing port value is the same as in Data Register.

Value of **I/O Selection Register:**

Only lower nibble is available for this function.

When set to a '1', respective GPIO port is programmed as an input port.

When set to a '0', respective GPIO port is programmed as an output port.

Value of **Output Data / Input Data:**

Only lower nibble is available for this function.

If a port is assigned to be an output port, then its respective bit can be read/write.

If a port is assigned to be an input port, then its respective bit can be read only.

Note:

Some other functions may occupy the high nibble of the registers. Altering any content in high nibble will be undesired.